Bioimpedance-defined overhydration predicts survival in end stage kidney failure (ESKF): systematic review and subgroup meta-analysis

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Supplementary Material

- (1) Supplementary Table 1
- (2) Appendix Summary of the strategy used whilst searching CENTRAL.

Supplementary Table 1: Summary of co-variates included in multivariable survival analyses (MVSA) within

(a) End-Stage Kidney Failure and (b) Heart Failure Cohorts

						(a)	Enc	l St	ag	e K	(id	ney	/ Fa	ailu	ıre	e Co	oho	ort	:s															
										Сс	o-m	orb	idit	y r	nat	trix	for	· co	var	iat	es	incl	ud	ed i	nΛ	1VS	Ά							
Author(s)	Year	Prim. Outcome	N(Mort)	MVA Туре	Censored	Age	Ethn	Gen	Modality	Vintage	Hospital stav	DM	P/CVD	Comorb	Chol	CRP	11-6	ΛII	СКР	NHYA	生	ВР	LVEF	AIT/ ECHO RNP	Trop	HPA	KtV/Cr	Alb	Phos	D/PCr	NonBIA	RRF	Prev/Adm	BI-OH Method
Abad	2011	Mortality	100	Cox analysis	N	х	;	x		Х																								PA*
Avram	2006	Mortality	89	Cox analysis	N	х	X Z	x				Х																						PA*
Beberashvili	2014	Mortality	38	Cox analysis	N	х)	x	Х	Х		Х	Χ																					PA**
Beberashvili	2014	Mortality	64	Cox analysis	Υ	х		x	Х	Х		Х		Х			Х										Х				Х	Х		PA***
Caetano	2016	Mortality	66	Cox analysis	Υ	х)	x	Х	Х	,	Х																						ОНІ**
Chazot	2012	Mortality	Unclear	Cox analysis	Υ		2	x)	(X	Х	,											Х												ОНІ**
Chen	2007	Mortality	58	Cox analysis	Υ	х	2	x						Х													Х	Х	Х		Х			ECWR**
de Araujo	2013	CV Events	13	Cox analysis	Υ	х			Х							Χ						Х												PA
Dekker	2017	Mortality	Unclear	Cox analysis	Υ	х)	x >	(Х		Х	Χ								Х										Х			ОНІ**
Demirci	2016	Mortality	93	Cox analysis	Υ			x >	(Х		Х										Х				Х	Х							BIVA**
Di Iorio	2004	Mortality	75	Cox analysis	N																													PA*
Fan	2015	Mortality	37	Cox analysis	N	X						Х																Х						ECWR**
Fein	2002	Mortality	4	Univariate analysi	is														\setminus															PA****
Fein	2008	Mortality	21	Cox analysis	Υ	х	X Z	x				Х																						ECWR*
Fiedler	2009	Mortality	36	Cox analysis	Υ	Х	2	x		Х	,	Х							\setminus															PA**
Guo/Guo	2015	Mortality	52	Cox analysis	Υ	Х	2	x				Х		Χ		Χ			\setminus			Х					Χ	Х		Х		Х		ECWR**
Норре	2015	Mortality	42	MLR	N							Х			Χ				\setminus)	(Х									ОНІ
Huan-Sheng	2016	Hospitalisatio n	13	Cox analysis	N	х)	x											\bigvee															ОНІ
Jotterand-Drepper	2016	Mortality	19	Cox analysis	Υ											Χ			\int		Х			Х	Х			Х						ОНІ**
Kim	2015	Mortality	50	Cox analysis	Υ	Х	;	X				Х	Х						$\sqrt{}$							Х	Х	Х	Х					ОНІ**
Kim	2017	Mortality	24	Cox analysis	Υ	Х						Х										Х												ECWR**
Koh	2011	Mortality	35	Cox analysis	N	Х		X		Х		Х							$\sqrt{}$			Х					Х	Х	Х					PA**

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Maggiore	1996	Mortality	23	Cox analysis	N												\perp															PA*
Mathew	2015	Mortality	41	MLR	Υ				Х																							ОНІ**
O'Lone	2014	Mortality	95	Cox analysis	N									Х												>	(OHI+ ECWR**
Oei	2016	Mortality	48	Univariate analysi	is																											OHI****
Onofriescu	2014	Mortality	9	Cox analysis	Υ	Х		Χ	Х		Х	Х	X	,																		OHI**
Onofriescu	2015	Mortality	66	Cox analysis	Υ	Х		Χ			Х	Х	X							Х	x x	(OHI**
Paniagua	2010	Mortality	182	Cox analysis	N	Х		Χ		х	Х	Х								Х			Х	(ECWR**
Paudel	2015	Mortality	72	Univariate analysi	is																											OHI****
Pillon/ Chertow	2004	Mortality	361	Unclear	Υ	Х	Х	Х			Х	Х			¶									X	,	11 >	(BIVA**
Ponce	2014	Mortality	20	Univariate analysi	is			•											•			•		•				•				оні
Pupim	2004	CV Mortality	23	Cox analysis	Υ	Х	Х	Х								Х)	x						PA*
Rhee	2015	Residual RF	15	Cox analysis	N	Х		Х				Х																				ECWR**
Segall/ Segall	2014	Mortality	43	Cox analysis	N														Х													PA**
Shin	2017	Mortality	15	Cox analysis	N	Х		Χ						Х																		PA**
Siriopol/ Siriopol	2015	Mortality	31	Cox analysis	Υ	Х					Х					х		X)	<				>	(OHI**
Siriopol	2017	Mortality	89	Cox analysis	Υ			Х			Х											Х	(оні
Tangvoraphonkchai	2016	Mortality	110	Cox analysis	N	х														П		1	ī									OHI**
Tian	2016	Mortality	44	Cox analysis	N	Х										Х				Х						>	(Х	(ECWR
Wizemann	2009	Mortality	86	Cox analysis	Υ			Х			Х)	x >	()	(ОНІ**
Zoccali	2017	Mortality	5866	Cox analysis	N				Х			Х												Х	()	X	X	(Х	(OHI**

								(k) F	lea	art	Fa	ilur	e (Col	าดเ	rts																		
							Co-morbidity matrix for covariates included in the MVSA																												
Author(s)	Year	Prim. Outcome	N (Mort)	MVA Туре	700000	DSU	Age F+b ~	Gen	BMI	Modality	Vintage	Hospital stay	DM	P/CVD	Comorb	Chol	CRP	IL-6	HIV	NHYA	生	ВР	LVEF	Alt/Echo	BNP	Trop	нья	KtV/Cr	Alb	Phos	D/PCr	NonBIA	RRF	Prev/Adm	BI-OH method
Alves	2016	Mortality	34	Cox analysis	N)	ĸ																					/			$\sqrt{}$		$\sqrt{}$		PA**
Castillo-Martinez	2007	NYHA Class	N/A	Univariate analysi	s																							$\overline{\ }$			$\sqrt{}$		$\sqrt{}$		PA+BIVA***
Colin-Ramirez	2012	Mortality	66	Cox analysis	N								х															$\overline{\ }$			$\sqrt{}$				PA**
Doesch	2010	Comparison with CMR.	8	Univariate analysi	s																							$\sqrt{}$					J		PA
Sakaguchi	2015	EF Survival	37	Cox analysis	N	>	ĸ												х	(Х		х		Х				$\sqrt{}$		J	х	ECWR**
Trejo-Velasco	2016	Adverse Events	37	Cox analysis	N)	ĸ												х	(J		BIVA**

Supplementary Table 1. Abbreviations and key: N (Mort) = number of endpoints (Defined in table 1). Covariates included in the MVSA are identified in the matrix: covariates coded " " are included in the MVSA and independently predict the primary outcome, "X" indicates they do not predict outcome, "¶" indicates in multi-study cohorts that the covariate was only included in 1 study and was not predictive of the primary outcome and blank squares denote the covariate was not included. BI-OH = type of measure used as described with abbreviations in text. MLR = Multiple Linear Regression, Ethn = ethnicity, Gen = gender, BMI = Body Mass Index, DM = diabetes mellitus, CVD = cardiovascular disease, Comorb = comorbidity Index (e.g. Charlson index), Chol = cholesterol, NHYA = NHYA classification of dyspnoea, HF = heart failure, LVEF = left ventricular ejection fraction, Alt/Echo = non LVEF echocardiographic measurements, BNP = brain natriuretic peptide, Trop = Troponin, HbA = Haemoglobin / Ferritin, KtV = KtV or creatinine, Alb = albumin, Phos = phosphate, PSTR = peritoneal solute transport rate, NonBI Nut = Other nutritional markers (i.e. SGA), RRF = residual renal function, Prev Adm = previous admission to hospital.

Appendix: summary of the strategy used whilst searching CENTRAL.

Each individual term is numbered, with the number of results for each search term being given at the end in parentheses.

Initial Sea	rch Process
MeSH	Individual Search Terms
(1) "Renal Dialysis" (4417)	(5) "dialysis" or "hemodialysis" or
	"haemodialysis" or "peritoneal dialysis" or
	"renal replacement therapy" (11964)
(2) "Chronic Kidney Disease" (3481)	(6) "end stage renal failure" or "esrf" or "end
	stage renal disease" or "esrd" or "chronic
	kidney disease" or "ckd" or "renal failure" or
	"kidney failure" or "renal insufficiency" or
	"kidney insufficiency" or "renal injury" or
	"kidney injury" (13450)
(3) "Electrical Impedance" (360)	(7) "bioimpedance" or "bio-impedance" or
	"bioimpedance analysis" or "bio-impedance
	analysis" or "bia" or "bio-impedance vector
	analysis" or "bioimpedance vector analysis" or
	"biva" or "phase angle" or "extracellular water"
	or "electrical impedance" (824)
(4) "Heart Failure" (5903)	(8) "heart failure" or "congestive cardiac
	failure" or "ccf" or "left ventricular systolic
	dysfunction" or "lvsd" or "left ventricular
	diastolic dysfunction" or "lvdd" or "right
	ventricular systolic dysfunction" or "rvsd" or
	"right ventricular diastolic dysfunction" or
	"rvdd" or "right sided heart failure" or "left
	sided heart failure" or "biventricular heart
	failure" or "right-sided heart failure" or "left-
	sided heart failure" or "bi-ventricular heart
	failure" (16047)
Combining S	Search Terms

- (9) MeSH terms: (1) or (2) or (4) and (3) 31 studies
- (10) Individual terms: (5) or (6) or (8) and (7) 121 studies
- (11) Final search output: (9) or (10) 128 studies
- (12) When cut off from 1990 and selected for manuscripts available in English language **120 studies**